I (WE) CLAIM:

- 1. A method for stabilizing an image plane in medical imaging, the method comprising:
 - (a) tracking motion within a region; and
- (b) automatically altering an acquisition scan plane position relative to a transducer as a function of the motion.
- 2. The method of Claim 1 wherein (a) comprises performing one of a cross-correlation and a sum of absolute differences.
- 3. The method of Claim 1 wherein (a) comprises comparing data from a first acquisition with data from a second acquisition.
- 4. The method of Claim 1 wherein (b) comprises translating and rotating an acquisition scan plane to the acquisition scan plane position.
- 5. The method of Claim 1 further comprising:
 - (c) scanning the region with ultrasound energy;
- (d) receiving input designating a region of interest within the region; wherein (b) comprises maintaining the acquisition scan plane position at the region of interest over time.
- 6. The method of Claim 1 wherein (a) comprises tracking the motion within the region, the region being a three-dimensional volume, and wherein (b) comprises altering the acquisition scan plane position relative to the transducer, the transducer being a multi-dimensional array of elements, the alteration maintaining an acquisition scan plane at a region of interest within the three-dimensional volume over time.
- 7. The method of Claim 6 further comprising:

(c) electronically steering acoustic energy across the acquisition scan plane;

wherein (a), (b) and (c) are repeated.

- 8. The method of Claim 6 wherein (a) comprises transmitting acoustic energy to at least three sub-regions of the three-dimensional volume without acquiring data for the entire three-dimensional volume.
- 9. The method of Claim 8 further comprising:
- (c) scanning a representative sample of the entire three-dimensional volume;

wherein (a) comprises comparing data responsive to the acoustic energy transmitted to the at least three sub-regions with data responsive to the representative sample.

- 10. The method of Claim 8 wherein (a) comprises:
- (a1) transmitting at least three grouped sets of beams spaced apart within the three-dimensional volume;
- (a2) determining a direction and a magnitude of motion from data responsive to the at least three grouped sets of beams for each of the at least three grouped sets of beams;

wherein (b) comprises altering the acquisition scan plane position as a function of the at least three directions and at least three magnitudes.

11. The method of Claim 1 wherein (b) comprises adaptively altering the acquisition scan plane position in response to the motion;

further comprising:

- (c) repetitively scanning the adaptively positioned acquisition scan planes; and
 - (d) generating two-dimensional images responsive to (c).
- 12. The method of Claim 11 further comprising:

- (e) shifting the two-dimensional images as a function of an initial position of the region of interest.
- 13. The method of Claim 1 further comprising:
 - (c) identifying at least one feature within the region; wherein (a) comprises tracking motion of the at least one feature.
- 14. The method of Claim 1 wherein (a) comprises tracking one of speckle and a spatial gradient.
- 15. The method of Claim 1 further comprising:
- (c) adjusting a tracking parameter for (a) as a function of a position of a tracking location within the region.
- 16. A method for stabilizing a scan plane within a volume in medical diagnostic ultrasound imaging, the method comprising:
 - (a) identifying a region of interest;
- (b) acquiring data representing at least portions of a three-dimensional volume positioned at least partly around the region of interest;
- (c) acquiring data representing sub-volumes of the three-dimensional volume, (c) using fewer scan lines than (b);
- (d) comparing the data representing the sub-volumes with the data representing at least the portions of the three-dimensional volume;
 - (e) detecting motion as a function of (d);
- (f) positioning a two-dimensional scan plane within the threedimensional volume as a function of the region of interest and the detected motion; and
- (g) acquiring a two-dimensional image responsive to the two-dimensional scan plane.
- 17. The method of Claim 16 further comprising:

- (h) repeating (c), (d), (e), (f) and (g) over time such that the twodimensional scan plane is adaptively positioned through the region of interest over time.
- 18. The method of Claim 16 wherein (b) comprises acquiring data representing an entire spatial extent of the three-dimensional volume, the entire spatial extent being based on an area of a two-dimensional transducer array used for (b), (c) and (g), wherein (c) comprises acquiring the data representing sub-volumes of the three-dimensional volume, the sub-volumes together being substantially less than the three-dimensional volume.
- 19. A method for stabilizing imaging within a volume in medical diagnostic ultrasound imaging, the method comprising:
- (a) repetitively scanning a two-dimensional area with a multidimensional transducer array;
- (b) repetitively detecting motion within a volume including the twodimensional area; and
- (c) adaptively re-positioning the two-dimensional area within the volume as a function of the detected motion.
- 20. A system for stabilizing a scan plane within a volume in medical imaging, the system comprising:
 - a multi-dimensional transducer array;
- a beamformer controller operative to control a position of a data acquisition scan plane relative to the multi-dimensional transducer array;
- a beamformer connected with the multi-dimensional transducer array, the beamformer responsive to the beamformer controller and operative to acquire data representing tissue at the data acquisition scan plane; and
 - a processor operable to detect motion within a volume;
- wherein the beamformer controller is operable to alter the position of the data acquisition scan plane in response to the detected motion.

- 21. The system of Claim 20 wherein the multi-dimensional transducer array comprises a two-dimensional transducer array.
- 22. The system of Claim 20 further comprising:

a user interface connected with the processor, the user interface operable to receive input indicating a region of interest; and

a display operable to display a sequence of two-dimensional images of the region of interest, the two-dimensional images responsive to the data acquisition scan plane.

- 23. The method of Claim 1 further comprising:
- (c) obtaining data for motion tracking in response to different acquisition parameters than used for imaging.
- 24. The method of Claim 1 wherein (b) comprises automatically altering an acquisition volume position relative to a transducer as a function of the motion.